

## I. INTRODUCTION

As the population of San Luis Obispo County has increased in recent years, concern about the adequacy of its water supply, particularly its groundwater<sup>1</sup> supply, has also increased. Nowhere is this more true than in the Arroyo Grande - Nipomo Mesa area. In 1979, when the Department of Water Resources conducted an assessment of the available groundwater resources within the Santa Maria Groundwater Basin, it mentioned that groundwater extractions had resulted in declining water levels in all parts of the study area.<sup>2</sup>

Therefore, the San Luis Obispo County Flood Control and Water Conservation District and the Department have entered into an agreement to update the 1979 report, expanding the area of study within San Luis Obispo County.<sup>3</sup> San Luis Obispo County delineated the study area for the new investigation setting the southern boundary at the Santa Barbara/San Luis Obispo County line. This is a report on the findings made in the new study.

### Objective and Scope

The objective of this investigation is to gain more knowledge about the water resources within the Arroyo Grande - Nipomo Mesa area.

This investigation expands the 1979 study area to include: (1) alluvial deposits from Lopez Dam downstream to the City of Arroyo Grande, (2) fringe areas around the Cities of Pismo Beach and Arroyo Grande, and (3) east of Highway 101 near Nipomo (Figure 1).

The work to be performed was documented in Contract DWR 165165 as:

- Review previous studies and refine scope of this study.
- Collect available surface and groundwater levels and quality data.

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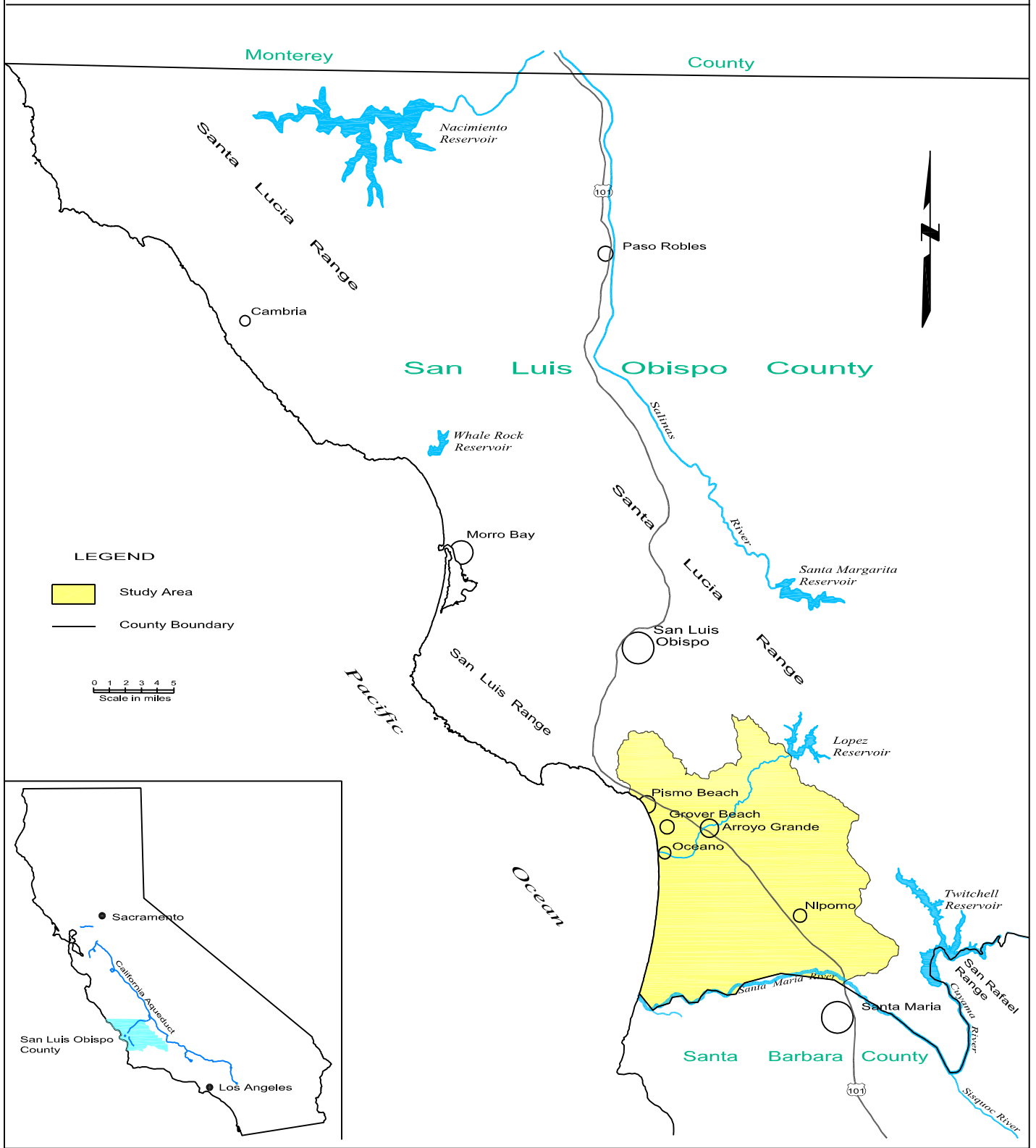
<sup>1</sup> A glossary of terms as used in this report is at the back.

<sup>2</sup> California Department of Water Resources, Southern District, *Ground Water in the Arroyo Grande Area*, District Report, June 1979. Selected references are in Appendix A.

<sup>3</sup> The agreement for the three-year study with San Luis Obispo County was executed in September 1993. The agreement stipulated that as soon as practical, after execution of the agreement, the Department commence work on the investigation. The Department began work in January 1996 and provided San Luis Obispo County with a draft report in April 1998, a second draft report in January 1999, and a final draft report in January 2000. Only the January 2000 report received widespread review and comment.



**FIGURE 1 - LOCATION OF STUDY AREA**





- Prepare a geologic map of the study area.
- Collect and review well drillers' reports and other subsurface geologic information.
- Construct geologic cross sections.
- Determine groundwater basin characteristics, including water levels, storage capacity, water in storage, safe yield, transmissivity, and natural and artificial replenishment.
- Determine quantity and quality of water available--groundwater, surface water, and recycled water.
- Make projections of population and land use.
- Determine present and projected water demand--agricultural, municipal, environmental, and "other."
- Examine relationship between water supply and demand.
- Examine factors influencing water demand.

The data assembled for this study are for the period of record through water year 2000,<sup>4</sup> except for water demand and supply data. The determination of water demand and supply and groundwater inflow and outflow was for the study period. Because this study is an update of the Department's 1979 investigation, the starting year of the study period, 1975, is taken from the last year of data for that report. The ending year of the study period, water year 1995, is the last year of the hydrologic base period.<sup>5</sup> The hydrologic base period for this study, which represents long-term average hydrologic conditions, is water years 1984 through 1995.

### **Data Availability**

To fulfill the tasks given above, information had to be acquired from numerous sources-- those agencies and individuals listed on the acknowledgment page and the Department's own files. Information obtained includes: geologic and hydrologic reports; population, water supply and demand, land use, water delivery, precipitation, streamflow, groundwater extraction, groundwater level, pump test, and surface water and groundwater quality data; wastewater treatment plant production, disposal, and reuse data; well completion reports and geophysical logs, and oil well lithologic and geophysical logs.<sup>6</sup> Reports and other documents reviewed for this study are listed in Appendix A.

The available data were in either paper or electronic format. Much of the collected data was initially on paper media and had to be entered into an electronic format for analysis in this study. Electronic information received recently does not always match with previously received data.

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<sup>4</sup> A water year is October 1 of one year through September 30 of the next year. It is usually designated by the second year.

<sup>5</sup> An explanation of how the base period was determined is in Appendix B.

<sup>6</sup> Discussion of well completion reports, locations, and reference elevations is in Appendix C.



Inconsistencies in the data required rectification of the suspect data before inclusion in this study's databases.

Analyses for this project relied on the collected available data. Data gaps are discussed in more detail in the appropriate sections of the report.

### **Area of Investigation**

The study area occupies 184 square miles (117,940 acres) of the southwestern coastal portion of San Luis Obispo County, between the City of San Luis Obispo and the City of Santa Maria in Santa Barbara County (Figure 1). It is bounded on the north and east by the Santa Lucia, San Luis, and San Rafael Ranges and on the west by the Pacific Ocean. The southern boundary is defined by the San Luis Obispo/Santa Barbara County line. The terrain of the study area is characterized by mildly sloping foothills on the north and east, which descend into alluvial valleys near the coast. Interspersed among the coastal alluvial valleys are tall eolian sand mesas.

The study area encompasses a portion of the watershed of Pismo Creek, the watersheds of Arroyo Grande and Nipomo Creeks, and that portion of the watershed of Santa Maria River within San Luis Obispo County. It lies within the following hydrologic (watershed) areas and subareas: the Pismo, Oceano, and Nipomo Mesa Hydrologic Subareas (HSA), and Guadalupe HA (Plate 1).<sup>7</sup> The Pismo HSA contains Pismo Creek watershed, the Oceano HSA is drained by Arroyo Grande Creek and its tributaries, the Nipomo Mesa HSA contains Black Lake Canyon and Black Lake, and the Guadalupe HA is drained by the Santa Maria River and Nipomo Creek.

Underlying about 50 percent, or 61,220 acres, of the study area is a portion of the Santa Maria Groundwater Basin, which extends into Santa Barbara County (Plate 1).<sup>8</sup> Within the study area, the basin includes the main basin, Santa Maria, and three subbasins-- Arroyo Grande Valley, Pismo Creek Valley, and Nipomo Valley.

Because of the study area's size and differences in hydrologic and topographic characteristics and to provide applicable information for San Luis Obispo County, the Santa Maria Groundwater Basin and the portions of the study area outside the basin were divided and evaluated based on the hydrologic boundaries (Plate 1). The divisions of the main Santa Maria Basin are: (1) the Tri-Cities Mesa - Arroyo Grande Plain portion that includes the lower Pismo Creek portion of the basin lying within Pismo HSA and the Tri-Cities Mesa, Arroyo Grande Plain, and Los Berros

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<sup>7</sup>Hydrologic Area and Hydrologic Subarea are the hierarchical nomenclature of watershed divisions in California. HSA is a subdivision of a HA. The hydrologic boundary for Nipomo Mesa HSA was field checked for this study.

<sup>8</sup>The results of this study are valid for the portion of the Santa Maria Groundwater Basin within San Luis Obispo County. No existing published investigations of the Santa Maria Basin analyzed the basin in its entirety within both San Luis Obispo and Santa Barbara Counties.



TABLE 1  
SURFACE AREAS OF HYDROLOGIC AREAS AND SUBAREAS

Hydrologic Area or Subarea <i>Division Within Groundwater Basin</i>	Amount Within Study Area		Amount Within Main Groundwater Basin		Amount Within Groundwater Subbasin	
	Acres	Square Miles	Acres	Square Miles	Acres	Square Miles
Pismo HSA	8,920	13.9				
<i>Pismo Creek*</i>			<i>320</i>	<i>0.5</i>	<i>1,220</i>	
<i>Pismo Creek Valley Subbasin</i>						<i>1.9</i>
Oceano HSA	52,880	82.6				
<i>Tri-Cities Mesa - Arroyo Grande Plain**</i>			<i>10,450</i>	<i>16.3</i>		
<i>Arroyo Grande Valley Subbasin</i>					<i>3,860</i>	<i>6.0</i>
Nipomo Mesa HSA	17,580	27.5				
<i>Nipomo Mesa</i>			<i>17,580</i>	<i>27.5</i>		
Guadalupe HA	38,560	60.2				
<i>Santa Maria Valley</i>			<i>21,560</i>	<i>33.7</i>		
<i>Nipomo Valley Subbasin</i>					<i>6,230</i>	<i>9.7</i>
Study Area Total	117,940	184.3				
<i>Groundwater Basin Total</i>			<i>49,910</i>	<i>78.0</i>	<i>11,310</i>	<i>17.7</i>

HA: Hydrologic Area

HSA: Hydrologic Subarea

Note: Acre values rounded to the nearest 10 acres and square mile values rounded to the nearest one-tenth of a square mile.

\* Shown separately from Tri-Cities Mesa - Arroyo Grande Plain to provide surface area amounts.

\*\* Includes the Los Berros Creek portion of the groundwater basin.

Creek portions of the basin lying within Oceano HSA; (2) the Nipomo Mesa portion of the basin, lying entirely within Nipomo Mesa HSA; and (3) the Santa Maria Valley portion of the basin, lying within Guadalupe HA. The subbasins were evaluated within their respective hydrologic area or subarea: Arroyo Grande Valley Subbasin, lying within Oceano HSA; Pismo Creek Valley Subbasin, within Pismo HSA; and Nipomo Valley Subbasin, within Guadalupe HA. Those remaining portions of the study area outside the groundwater basin were also evaluated within their respective hydrologic area or subarea. Table 1 gives the surface acreage of the hydrologic areas and subareas and the divisions of the groundwater basin within the study area.

The climate of the study area is typical of Central California coastal communities. Precipitation varies widely both temporally and spatially. Rain gages located near Pismo Beach frequently measure about 16 inches of precipitation annually, while those around Lopez Reservoir measure 20 to 22 inches annually. Close to Guadalupe, precipitation averages slightly more than 12 inches annually and, in the vicinity of Santa Maria, about 14 inches annually. About 75 percent of the precipitation falls in December through March.

The Cities of Arroyo Grande, Grover Beach, and Pismo Beach and the communities of Oceano



and Nipomo lie within the study area. These communities receive all or a portion of their water supply from the Santa Maria Groundwater Basin. Lopez Reservoir (not within the study area) is an important source of water supply within the study area. In August 1997, the Coastal Branch of the State Water Project began bringing water to several of the communities. Plate 1 shows its general alignment.

Historically, the area has been and continues to be dominated by its agricultural production, and tourism is close behind as a substantial economic source.